Cornell University Library

We gratefully acknowledge support from the Simons Foundation and member institutions

arXiv.org > cs > arXiv:1105.5924

Search or Article-id (Help | Advanced search) All papers Go!

Computer Science > Numerical Analysis

# Reconstruction of Fractional Brownian Motion Signals From Its Sparse Samples Based on Compressive Sampling

Andriyan Bayu Suksmono

*(Submitted on 30 May 2011)*

This paper proposes a new fBm (fractional Brownian motion) interpolation/reconstruction method from partially known samples based on CS (Compressive Sampling). Since 1/f property implies power law decay of the fBm spectrum, the fBm signals should be sparse in frequency domain. This property motivates the adoption of CS in the development of the reconstruction method. Hurst parameter H that occurs in the power law determines the sparsity level, therefore the CS reconstruction quality of an fBm signal for a given number of known subsamples will depend on H. However, the proposed method does not require the information of H to reconstruct the fBm signal from its partial samples. The method employs DFT (Discrete Fourier Transform) as the sparsity basis and a random matrix derived from known samples positions as the projection basis. Simulated fBm signals with various values of H are used to show the relationship between the Hurst parameter and the reconstruction quality. Additionally, US-DJIA (Dow Jones Industrial Average) stock index monthly values time-series are also used to show the applicability of the proposed method to reconstruct a real-world data.

| | |
|---|---|
| Comments: | 6 double-column pages, 5 figures, submitted to ICEEI-2011 |
| Subjects: | **Numerical Analysis (cs.NA)**; Probability (math.PR); Data Analysis, Statistics and Probability (physics.data-an); Computation (stat.CO) |
| MSC classes: | 62M10 |
| ACM classes: | G.3; B.2.4; J.4 |
| Cite as: | **arXiv:1105.5924 [cs.NA]** |
| | (or **arXiv:1105.5924v1 [cs.NA]** for this version) |

## Submission history

From: Andriyan Suksmono Bayu [view email]
**[v1]** Mon, 30 May 2011 10:11:06 GMT (256kb)

## Download:

- PDF only

Current browse context:
**cs.NA**
**< prev | next >**
new | recent | 1105

Change to browse by:
cs
math
math.PR
physics
physics.data-an
stat
stat.CO

References & Citations
- NASA ADS

DBLP - CS Bibliography
listing | bibtex
Andriyan Bayu Suksmono

Bookmark(what is this?)

*Which authors of this paper are endorsers?*

Link back to: arXiv, form interface, contact.